Technical Review No. 1
Dakotas Wind Transmission Study
HDR / Western Area Power Administration
Billings, Montana
January 19, 2005

The attendees and agenda are listed below. The presentation slides, ABB's Methods and Assumptions, and TrueWind's Method's and Assumptions are available in separate files.

Cristy Hoferer (HDR) opened with a welcome, introductions, and an overview of the study.

Task 1

Don Martin (ABB) presented proposed methods and assumptions for Task 1 (Analyze Non-Firm Transmission Potential Relative to New Wind Generation). The seven wind development study zones identified in the study scope were discussed. For the simultaneous case in Tasks 1, 3, and 4, the Edgeley/Ellendale/Wishek, the Summit/Watertown/Toronto/White/Brookings/Flandreau zones, and one other zone yet to be selected will each be run at 100 MW of wind generation; the other four zones will be run at 50 MW each for a total of 500 MW of new wind generation at all seven zones.

The base analysis year will be 2003. Study corridor power flow data and regional generation and load data has been collected for this year. The DC ties are included in load. Data for the Watertown-Granite falls corridor will be collected from the Granite Falls end. ABB still needs 2003 generation data for Oahe and Big Bend (Ft. Thompson); Jim Haigh (WAPA) will send this data to ABB. TrueWind will model hourly wind production for 2003.

The question whether 2003 was a 'representative' year was discussed. The group agreed that 2003 was clearly a low year for hydropower generation. Higher hydro generation will be modeled as a sensitivity case. The higher hydro generation will be modeled by scaling the generation data set up (actual data sets for prior high hydro years are no longer available) until the NDEX transfer limit is hit on the peak; Western will supply ABB with representative hourly profiles of hydro generation which will be used to ensure that the diurnal and seasonal profiles of the hydro generation are preserved in the scaling process. The group discussed but was unsure whether 2003 was a 'representative' year for wind generation in the Dakotas; TrueWind will check this for both total wind energy production and for whether the general diurnal and seasonal wind patterns were 'representative' in 2003; if 2003 is found to be historically significantly high or low, then an appropriate complementary sensitivity case will be run. Also, a higher load sensitivity case will be run.

Additional discussion regarding Task 1 included concern that an inappropriately high level of detail should not be sought in parts of the study because the solution can be no more accurate than the least accurate number in the data set; potential impacts of the imminent MISO market startup on allocation of the existing NDEX transfer capacity; and

issues related to both scheduled and unscheduled generation and transmission line outages.

Task 2

Don Martin (ABB) presented proposed methods and assumptions for Task 2 (Assess Potential of Transmission Enhancement Technologies Relative to New Wind Generation). The potential technology enhancements listed in the study scope and in the presentation slides were discussed. Moving to higher voltage lines in existing corridors will be considered when potential new transmission lines are evaluated in Tasks 3 and 4. Previous ABB reconductoring analysis will be reviewed, updated as needed, and incorporated into the study. The possibility of raising structures (to achieve more transfer through improved clearance) could be considered, in coordination with other previously scheduled field work; this has already been implemented a fair amount in the Dakotas (particularly in eastern South Dakota).

Task 3

Don Martin (ABB) presented proposed methods and assumptions for Task 3 (Interconnection of New Wind Generation). Issues related to studying interconnection of the new wind in the seven zones identified in the study scope were discussed. The analysis will start at 500 MW at each zone and increment down. ABB expressed concern that the severe transmission limits at site 5 (south central South Dakota zone) would require starting at a value lower than 500 MW; the group stated that the full potential capability of this zone should be explored and suggested application of options (e.g. Task 2 solutions) to enhance the capability of this zone.

The group extensively discussed which power flow model years and cases were most appropriate for this study. The stability analysis will be done with the Northern MAPP 2003 off peak case. For the non-stability analysis, the MAPP 2009 model (2004 series) will be used. For the wind development study zones without existing generation nearby (sites 2, 3, 4, 5, and 7) the off peak case will be used. For sites 1 and 6 (Garrison and Ft. Thompson), the peak case will be used. For site 7 (eastern South Dakota), a sensitivity case which compares the peak and off peak case (load and generation) will be done.

Task 4

Don Martin (ABB) presented proposed methods and assumptions for Task 4 (Transfer Capability for New Wind Generation). Issues related to studying delivery to market of the new wind in the seven zones identified in the study scope were discussed. The group discussed the wind turbine models to be used in this study; ABB will model a doubly fed induction generator ('best available') and will examine both assumed voltage ride through and assumed trip conditions. ABB will use Shaw PTI's MUST (Managing and Utilizing System Transmission) program. The power flow models used in Task 3 (described above) will also be used in Task 4. Three separate market cases will be run (delivery to Twin Cities, central and eastern Iowa, and Omaha and Kansas City) as well as a combination of all three. A sensitivity case will analyze delivery within the Dakotas (both generation-generation and generation-load).

Schedule

The dates were set for the next two technical reviews. Review number 2 (review of draft results for Tasks 1 and 2) will be 8 a.m. to 1 p.m., Tuesday, March 29th. Review number 3 (review of draft results for tasks 3 and 4) will be 8 a.m. to 1 p.m., Tuesday, May 26th. Both will be in Billings, Montana.

Participants

Ray Brush (by phone), Northwestern Energy
Wayne Haidle, Montana Dakota Utilities
Jim Haigh, Western Area Power Administration
Cristy Hoferer, HDR/Western Area Power Administration
Mike Jacobs, American Wind Energy Association
Don Martin, ABB
Sam Miller, Western Area Power Administration
Brian Parsons, National Renewable Energy Laboratory
Larry Schedin, LLS Resources / Wind on the Wires
Jeremy Severson, Basin Electric Power Cooperative
Matthew Stoltz, Basin Electric Power Cooperative
Matt Schuerger, ESCS/HDR/Western Area Power Administration
Tom Wind, Wind Utility Consulting / tribal interests
Ed Weber, Western Area Power Administration

DAKOTA WIND TRANSMISSION STUDY
AGENDA

January 19, 2005 Meeting
Boothill Inn, Billings MT

I. INTRODUCTION – 8 a.m.

A. Meeting Participants
B. Background for Study Request

II. REVIEW OF ASSUMPTIONS AND METHODS

A. Task 1 – Analyze Non-Firm Transmission Potential Relative to New Wind Generation
   1. Development of Wind Generation Estimates
   2. Gridview Transmission Constraint Evaluation Method
   3. Sensitivities of Hydro and Load
B. Task 2 – Assess Potential of Transmission Enhancement Technologies Relative to New Wind Generation
C. Task 3 - Interconnection of New Wind Generation (7 sites)
D. Task 4 - Transfer Capability for New Wind Generation

III. DATA REQUIREMENTS FOR THE STUDIES

A. Review of Data Received
B. Data Still Needed

IV. REVIEW OF SCHEDULE

A. Study Schedule
B. Proposed Technical Review Meeting Dates
   Meeting #2 (Draft results for Tasks 1 & 2) ~Week of March 20th
   Meeting #3 (Draft results for Tasks 3 & 4) ~Week of May 23rd

V. Adjourn